1857MNRAS..17...56T

G.M.T.	Sun's Longitude.		Log. Rad. Vector.	Sun's R. A.	Sun's Decl.
h m	° ′ ″			° ′ ″	° ′ ″
3 36	83 40 1·7			83 5 12·0	+23 35 44·2
6 0	83 45 45·4		0·00708	11 26·5	36 0·9
8 24	83 51 29·1			83 17 41·3	+23 36 17·0

Obliquity = 23° 44′ 57″·8

"These places give the following points of the curve of the central eclipse:—

Longitude, East of Greenwich.	Latitude.
° ′	° ′
8 41	44 4
9 39	43 36
10 38	43 8
11 38	42 40
12 37	42 12

"The central eclipse passes, therefore, very nearly over Rome. I have now obtained for Rome:—

	Mean Time at Rome.
	h m
Beginning of the eclipse generally	6 40
Beginning of the total obscuration	7 30
End of the total obscuration	7 33
End of the eclipse generally	8 20

"On this day the sun set at Rome at 7h 36m Roman Mean Time; the total eclipse was, therefore, quite visible at Rome, and the sun set immediately after the completion of it. By this means does the otherwise unintelligible passage of Ennius, 'Soli luna obstitit et nox,' become quite clear; the poet has simply omitted the word 'simul.'

"Professor Zech has previously found an eclipse at the setting of the sun at Rome; but he obtains only a partial eclipse, and its maximum takes place after the sun has set. His longitude of the moon is 8′ 51″ too small, and his latitude is too great by 1′ 46″."

Abstract of a Report on the Determination of the Latitude at Karachi. By Lieut. Tennant, of the Bengal Engineers, First Assistant G. T. Survey of India.

The operation took place in March and April 1855. The paragraphs in inverted commas are from the author's MSS.

"It having been considered desirable that the latitude should be well observed in the neighbourhood of Kărāchi, both as an initial element for the Great Indus Series, which will form the western limit of the G. Trig. Survey operations, and as verificatory of the results of the Great Longitudinal Series, I was instructed by the Surveyor-General during the recess of 1854 to build an observatory in the neighbourhood of the Karachi Base, where this datum might be astronomically determined.

" I finally fixed on Bath Island as the site of the Observatory. The so-called island is an isolated hill situated about half-way between Karachi cantonment church and the Sanatarium of Clifton. It is nearly surrounded by the sea at each high-water, and at the highest spring-tides is completely so. The road from Karachi to Clifton passes to the east at some distance, and there were no buildings of any description on the island.

" In order to secure so valuable a locality, I procured from the commissioner in Sind a grant of the whole island beyond cantonment limits; and it will be a good site for a permanent observatory, should one be established in this part of India. The surface of the island is a loosely conglomerated gravel; but at about 3·5 feet below it, a layer of firmer materials is found, on which the walls, and collimator-, and clock-pillars, are supported; and about 4·5 feet again below this another very firmly consolidated stratum formed the support for the pillars of the instruments." . . .

Drawings, in full detail, accompany the paper, showing the construction of the walls and roof, and provision for ventilation.

" The mark to which each instrument was adjusted is a fine drill-hole in a brass plug, which was fixed in the pillar on the level of the floor.

" The position of the geodesical station is as follows, from the connexion with the Great Longitudinal Series: —

	° ′ ″	
Latitude (from Kalianpur)	24 49 50·2	N.
Longitude (corrected to Taylor's last result for Madras)	67 1 0·7	E.
Height above sea-level of mark	38·10 feet.	

" The last element was determined in the harbour, and the level brought up trigonometrically."

The instruments used were the " Troughton" astronomical circle, described in Col. Everest's account, the Troughton and Simms' 34-inch theodolite, modified in some of its parts, a clock by Jones, and a collimating apparatus extemporised for the occasion.

In selecting the stars for observation, the Surveyor-General had decided that they should be about thirty in number, and should extend over 30° of N.P.D., situated half on each side of the zenith; and that the zenith distances to the north were to be equal to those to the south, as nearly as possible, to eliminate any error in the refractions applied.

The mode of observation was very generally similar to that described in Col. Everest's work. The number of stars ultimately selected was thirty-three, recently determined positions of the

1857MNRAS..17...58T

whole of which were received from Madras, and of eighteen of which from Greenwich. Lieut. Tennant finds a small outstanding discordance in his two results, when the two authorities for the stars are separately used, which for the present he leaves undecided, giving the preference temporarily to the results from the Madras stars, for reasons stated in the MSS.

The latitude of the Karachi geodesical station thus found (from 807 observations) was—

	°	′	″
By Madras positions of stars	24	49	49·3
Greenwich			50·0

The azimuth of the referring mark was found to be,

	°	′	″
By E. and W. elongations of *Polaris*	179	59	57·4
Same as brought up from Kalianpur			57·7

The intermediate results of the calculations are given in tables at much length.

An Examination of the Figure of the Indian Meridian as deduced by the Venerable Archdeacon Pratt from the two Northern Indian Arcs; with a Proposition for testing that form by Astronomical Observation. By Lieut. J. F. Tennant, Bengal Engineers, F.R.A.S.

1. On my arrival in May last at the Surveyor-General's Office, I met with Mr. Pratt's paper on Himalayan Attraction in the *Philosophical Transactions*, and it occurred to me that the arc of longitude from Kalianpur to Karachi completed in 1853 would furnish a means of verifying its results.

2. When, however, I applied the data given by Mr. Pratt to it and the southern meridianal arc, I became convinced that some error had been committed in the solution of the equations, and I therefore examined this with the following result.

The mean value of $d\,e$ was

$$-0{\cdot}00097840\,;$$

whence we get

$$e = 0{\cdot}002346 05,$$

which coincides to the last figure with the value given in the paper referred to.

On adding, however, the three equations, and substituting this value of e, I found

$$\alpha = -0{\cdot}0019209$$

which differs entirely from the value given for this quantity.

3. Using these values of $d\,e$ and α, I find the following